

Portal and Superior Mesenteric Venous Gas with Retroperitoneal Abscess

— CT Diagnosis (Case Report) —

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We present a case of portal and superior mesenteric venous gas in a 31-year-old diabetic woman with a left-sided retroperitoneal abscess. Five years prior to admission, patient was diagnosed with diabetes mellitus and developed emphysematous pyelonephritis, requiring nephrectomy on the left side. A CT examination showed air distributed throughout the portal venous system and superior mesenteric vein.

Key Words: Portal venous gas, Retroperitoneal abscess, CT scan

INTRODUCTION

Many reports of gas in the portal vein and its branches have appeared in the medical literature since the first case was recognized in 1955 (Wolfe and Evans, 1955). The majority of cases has been related to pyelonephritis, inflammation of the portal vein, usually resulting from intestinal disease. To our knowledge, portal venous gas with retroperitoneal abscess has not been reported in the English literature. Surgical intervention is imperative to improve the chance of survival, except in cases of ulcerative colitis.

We describe a patient with a left-sided retroperitoneal abscess, which gave rise to gas in the portal venous system and superior mesenteric vein.

CASE REPORT

A 31-year-old Korean woman presented with left flank pain, fever, chills, and a bulging mass in the left upper quadrant of the abdomen of 15 day duration. Five years before, patient underwent nephrectomy of the left side for emphysematous pyelonephritis. Patient also had history of diabetes mellitus which was never treated. On physical examination, patient appeared

acutely ill. She had a surgical scar in the left upper quadrant. A non-tender, smooth, fixed mass was palpated in the left upper quadrant. The bowel sounds were weak. The following abnormal laboratory values were obtained: white blood cell count, 16,800/mm³; hemoglobin, 11.9 g/dl; hematocrit, 33.5%; serum urea nitrogen, 24 mg/dl; serum creatinine, 1.7 mg/dl; serum amylase, 60 mg/dl and blood sugar, 400 mg/dl. Plain abdominal radiograph showed paralytic ileus in right abdomen. It also showed a 15 × 7cm radiolucent mass in the left upper abdomen. A CT examination revealed a large retroperitoneal abscess with gas bubbles in left upper abdomen. Gas was seen in peripheral portion of the liver with branching pattern, corresponding to portal venous radicles, and in superior mesenteric vein as well (Figs. 1-3). Retroperitoneal abscess was treated with percutaneous catheter drainage. Approximately 500ml of pus was drained from the abscess which grew *E. coli*, however, the etiology of the retroperitoneal abscess remained unknown.

CT scans 10 days following the drainage procedure showed disappearance of the gas in both portal and superior mesenteric vein. There still remained a small amount of retroperitoneal abscess with air bubbles.

She was also treated with antibiotics and insulin. Four weeks after the treatment, the retroperitoneal abscess was completely disappeared on CT scans and the percutaneous drainage catheter was removed. This patient is now in good condition.

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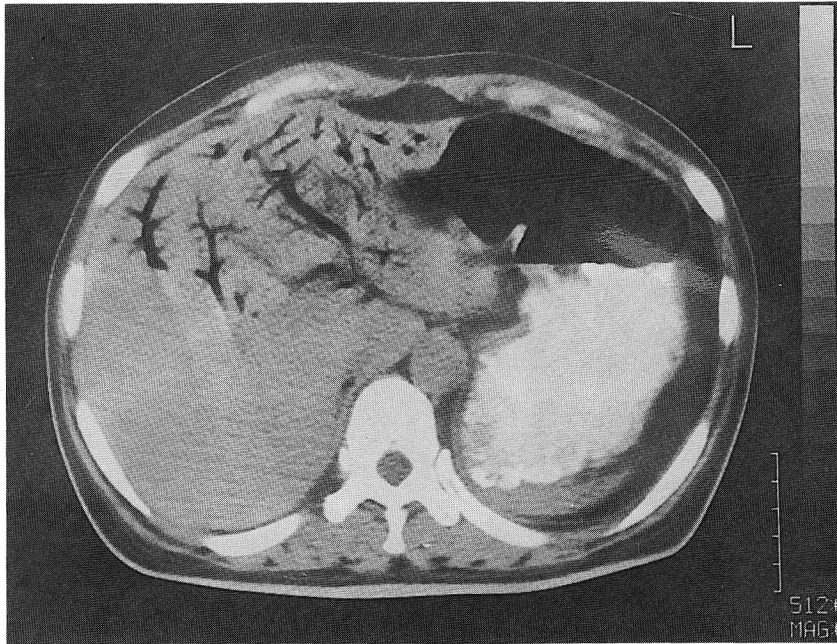


Fig. 1. CT scan of the liver reveals hepatic portal venous gas which was extended to almost periphery of the liver edge.

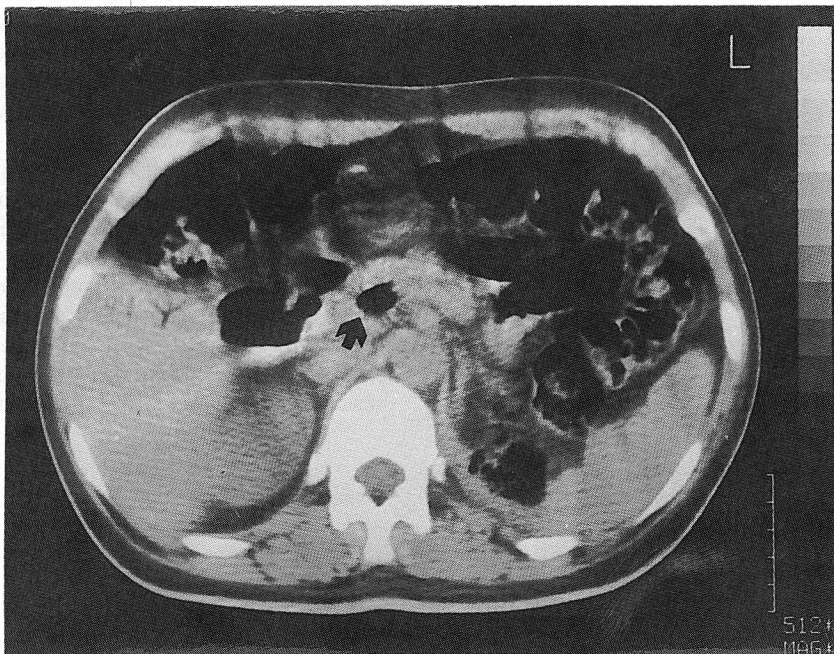


Fig. 2. CT scan shows gas in the superior mesenteric vein (arrow)

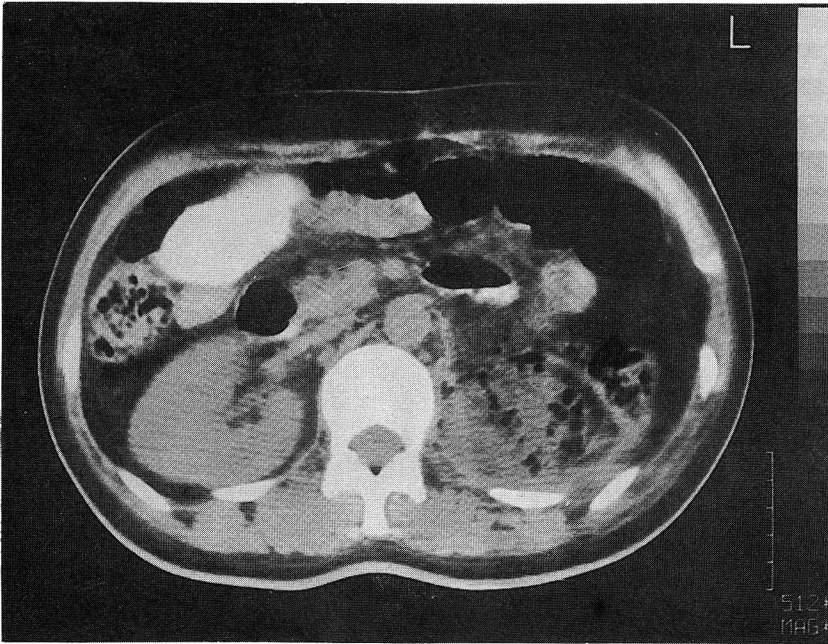


Fig. 3. CT scan through the mid-abdomen shows abscess with multiple air bubbles in left side renal fossa.

DISCUSSION

Portal venous gas was first described by Wolf and Evans in 1955. Two mechanisms have been postulated: 1 > direct extension of intramural gas by way of the mesenteric and portal veins secondary to increased intraluminal pressure, or 2 > the actual presence of gas-forming bacteria within the portal venous system (Kennedy and Ricketts, 1986) resulting from intestinal disease such as necrotic bowel, ulcerative colitis, intra-abdominal abscess, small bowel obstruction, gastric ulcer (Liebman, *et al.*, 1978), necrotizing enterocolitis (Kennedy and Ricketts, 1986), hepatic artery embolization (McCarthy, *et al.*, 1990), transhepatic intra-abdominal abscess drainage (Tranisi, 1989), and diverticulitis (Haak and Falke, 1990). Sepsis alone without necrotic bowel is an infrequent cause of portal venous gas. In 6% of the patients, portal venous gas was associated with an intra-abdominal abscess without either intestinal distention or mucosal damage (Liebman, *et al.*, 1978). In our patient, the direct mechanism of portal and superior mesenteric venous gas was not determined. It may be a direct result of the retroperitoneal abscess.

Portal venous gas should be differentiated from gas in bile ducts on CT scans. Portal venous gas is characterized by multiple small tubular lucencies in the

periphery of the liver. Typically they extend to the liver capsule. In contrast, gas in bile ducts is usually central and limited to the larger biliary radicles around the porta hepatis and it does not extend closer than 2cm from the edge of the liver. This distribution probably is secondary to the centripetal direction of the bile flow. In adults, air in the biliary system is usually of relatively benign origin, whereas air in the portal venous system has more grave clinical significance.

The diagnosis of portal venous gas is still usually made on plain abdominal radiography. A typical branching pattern of air is seen in peripheral portion of the liver as compared with aerobilia which is more centrally located. Plain radiography did not visualize portal venous gas in our patient, possible because of paralytic ileus and abdominal distention. For this patient, CT examination provided a conclusive diagnosis with its excellent spatial and contrast resolution.

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